Claims

1. A flow testing system for facilitating the continuous flow testing of fluid flow systems and components, said flow testing system comprising:

a flow amplifier subsystem configured for coupling to an air intake and for providing a controlled air flow;

a venturi subsystem configured for facilitating determination of said controlled air flow through providing of a pressure difference within;

a piping subsystem configured for coupling said flow amplifier subsystem to said venturi subsystem to receive said controlled air flow; and

an output coupling subsystem configured to couple said venturi subsystem to a fluid flow component for flow testing; and

wherein said flow testing system determines flow within the fluid flow component to determine if any defects exist within the fluid flow component.

2. The flow testing system according to claim 1, wherein said flow amplifier subsystem is coupled to the air intake through a filter valve.

3. The flow testing system according to claim 2, wherein said filter valve is configured to provide a seal for said flow amplifier subsystem during self-testing of said flow testing system.

4. The flow testing system according to claim 1, wherein said flow amplifier subsystem is configured to receive air from an air intake source of between approximately 80-100 PSI and a flow level between approximately 5-100 SCFM.

5. The flow testing system according to claim 1, wherein said flow amplifier subsystem is configured to convert air from the air intake source to a controlled air flow of between approximately 1-3 PSI and a flow level between approximately 75-1000 SCFM.

6. The flow testing system according to claim 1, wherein said flow amplifier subsystem comprises:

a flow amplifier configured for coupling to an air intake and for providing a controlled air flow;

a seal test device coupled to said flow amplifier and configured for providing a compliance seal to said flow amplifier to facilitate self-testing of said flow testing system;

a proportional regulator configured to regulate operation of said seal test device; and

a check valve coupled between said seal test device and said proportional regulator to prevent air from flowing from said seal test device back to said proportional regulator.

7. The flow testing system according to claim 1, wherein said piping subsystem comprises a passageway and an output connection configured for providing measurements of one of temperature and barometric pressure to facilitate mass-flow calculations.

8. The flow testing system according to claim 7, wherein said piping subsystem further comprises a resistance temperature detector for providing temperature compensation during determination of said mass-flow calculations.

9. The flow testing system according to claim 1, wherein said venturi subsystem comprises:

a venturi component configured to facilitate measurement of said pressure difference, said venturi component having an entry output port and an exit output port; and

a pressure difference flow device coupled to said entry output port and an exit output port to measure said pressure difference to facilitate flow calculations.

10. The flow testing system according to claim 9, wherein said venturi and said pressure difference flow device are configured in a controlled feedback loop with said flow amplifier subsystem to facilitate said controlled air flow.

11. The flow testing system according to claim 9, wherein said pressure difference flow device is configured to receive a compensation signal to compensate for one of temperature and barometric pressure when determining said pressure difference to facilitate mass-flow calculations.

12. The flow testing system according to claim 9, wherein said pressure difference flow device comprises an output signal indicative of said pressure difference to facilitate flow calculations.

13. The flow testing system according to claim 1, wherein said venturi subsystem comprises one of a venturi, restrictor plate, orifice plate and a sonic nozzle.

14. The flow testing system according to claim 1, wherein said output coupling subsystem comprises a coupling component for coupling to the fluid flow component.

15. The flow testing system according to claim 14, wherein said coupling component comprises a seal nest having a plurality of adapter plates and a plurality of sealing rings configured for providing a seal around the fluid flow component and to grip the fluid flow component.

16. The flow testing system according to claim 1, wherein said output coupling subsystem system is configured for facilitating measurements of pressure differences between an entry side and an exit side of the fluid flow component.

17. The flow testing system according to claim 1, wherein said flow testing system further comprises an automated positioning system configured for coupling said output coupling subsystem to the fluid flow component, said automated positioning system comprising a gripper device for gripping the fluid flow component, and a robot device for moving the fluid flow component.

18. The flow testing system according to claim 1, wherein said output coupling subsystem comprises an end cap configuration for facilitating self-testing of said flow testing system.

19. The flow testing system according to claim 1, wherein said output coupling subsystem comprises an output device having an output port, and a pressure difference flow device having a first input port coupled to said output port of said output device for measurement of pressure within said output device, said pressure difference flow device having a second input port configured to measure ambient pressure.

20. The flow testing system according to claim 19, wherein said pressure difference flow device configured to measure differences in pressure of between said first input port and said second input port to facilitate mass-flow calculations for flow through the fluid component.

21. The flow testing system according to claim 20, wherein said flow testing system further comprises a control system configured for control of said flow testing system, said control system is coupled to said flow amplifier subsystem, said venturi subsystem and said output coupling subsystem to control operation of said flow testing system.

22. A method for providing continuous flow testing of fluid flow systems and components, said method comprising the steps of:

establishing a controlled air flow in a flow amplifier through a venturi configured in a closed-loop system;

measuring flow within a fluid flow component, and

determining if a defect exists in said fluid flow component.

23. The method according to claim 22, wherein said step of establishing a controlled air flow occurs after connecting said fluid flow component to an output coupling subsystem.

24. The method according to claim 22, wherein said step of establishing a controlled air flow occurs before connecting said fluid flow component to an output coupling subsystem.

25. The method according to claim 22, wherein said step of establishing a controlled air flow in a flow amplifier comprises receiving air from an air intake source of between approximately 80-100 PSI and a flow level between approximately 5-40 SCFM.

26. The method according to claim 22, wherein said step of establishing a controlled air flow in a flow amplifier comprises converting air from the air intake source to a controlled air flow of between approximately 1-3 PSI and a flow level between approximately 75-600 SCFM.

27. The method according to claim 22, wherein said step of establishing a controlled air flow comprises measuring differences in pressure within an entry port and an exit port of said venturi and calculating flow within said flow amplifier.

28. The method according to claim 27, wherein said step of measuring differences in said pressure comprises measuring said pressure with a pressure difference flow device coupled to said entry port and said exit port of said venturi.

29. The method according to claim 22, wherein said step of measuring differences in said pressure comprises compensating for one of a temperature and a barometric pressure to facilitate mass-flow calculations.

30. The method according to claim 22, wherein said step of measuring flow within the said fluid component comprises measuring differences in pressure within an entry side and an exit side of said fluid component and calculating flow within said fluid component.